

AFIT/GTM/LAR/96S-11

**IDENTIFYING SITUATIONAL CONSTRAINTS  
TO FOCUS QUALITY IMPROVEMENT  
IN AN AIR FORCE AERIAL PORT**

**THESIS**

**TIMOTHY J. PETTIT  
CAPTAIN, USAF**

**AFIT/GTM/LAR/96S-11**

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Timothy J. Pettit, B.S., Captain, USAF

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Timothy J. Pettit

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**Abstract**

This research analyzes the effects of situational constraints on individual performance within an Air Force Aerial Port squadron. Situational constraint research originated with laboratory studies by Peters and O'Connor in 1980 and was investigated in an Air Force field environment in 1984; mixed results were obtained. Laboratory studies identified direct performance inhibitors (Peters et al., 1980); however, field studies found little correlations with job performance (Kane, 1981; O'Connor et al., 1984a). Data collected in June 1995 (Dougherty, 1995) and March 1996, in this study, were used to accomplish a longitudinal analysis. Correlations between constraints and performance were also low in this study; however, significant reductions in constraints were identified in 12 of the 14 work groups investigated. Results suggest that O'Connor et al.'s measure (1984a) may be useful in identifying bottlenecks requiring managerial actions.



## **IDENTIFYING SITUATIONAL CONSTRAINTS**

### **TO FOCUS QUALITY IMPROVEMENT**

### **IN AN AIR FORCE AERIAL PORT**

#### **I. Introduction**

##### **Issue**

Research began in the early 1980s to examine relationships between situational constraints and individual performance (Peters and O'Connor, 1980; Kane, 1981; Steel and Mento, 1986). An example of this association, from a study which will be discussed later, is the performance limitations experienced when building a child's Erector® set model without the correct size wrench. The goal of these first studies was to identify the most inhibiting resource or process (e.g., a bottleneck) (Peters and O'Connor, 1980) and target improvement efforts at areas that will gain the greatest system-wide benefit at the least cost. Ironically, these studies attempted to identify situational factors that hampered performance using cross-sectional methods that treat situational differences as simply measurement errors by assuming that the organization has not changed over time. The premise of this thesis is that work constraints are both situational (i.e., they differ between departments or sub-groups within an organization) and dynamic (i.e., they change over time as managers solve problems and new problems surface). Each functional sub-unit may experience varying levels of constraints that may have different impacts on important

outcomes. For example, a member of a department whose main duties involve working outdoors may experience conditions that inhibit performance to a greater extent than members of a department whose main duties involve office work. The impact of a constraint may change over time, as requirements, resources, processes and the task environment change. Therefore, this study will measure situational constraints across time and work units to evaluate the usefulness of O'Connor et al.'s (1984) instrument in identifying bottlenecks.

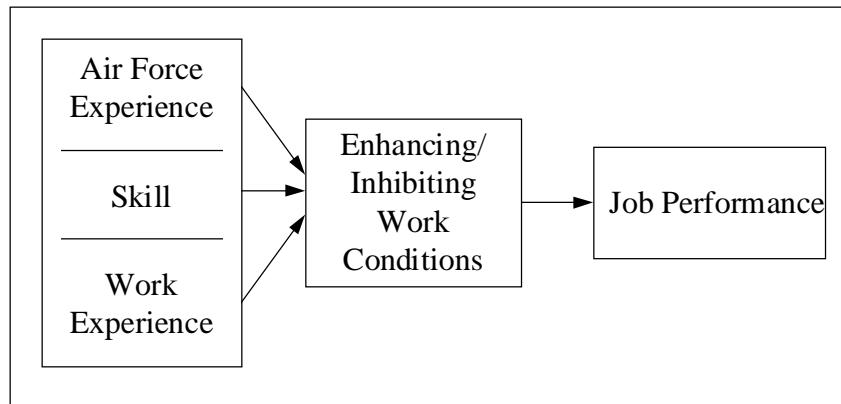
My study focuses on situational constraints that are hypothesized to facilitate or inhibit successful performance. Situational factors with the most practical value are those that can be alleviated through unilateral management action. They differ from the kind of individual performance factors like employee attitude and motivation that are often the focus of management research. Examples of situational factors include tools, training, weather, forms and policies (Peters et al., 1980; O'Connor et al., 1984a).

Peters, O'Connor and Rudolf (1980) attempted to better understand and define work performance facilitators and inhibitors. They found that in laboratory settings, situational constraints (i.e., the lack of required information, supplies, equipment, etc.) limited individual performance. Constraints reduced the performance of both high performers and low performers. However, these studies were performed in controlled environments which experimenters could vary the constraints uniformly for subjects performing the same task in the same setting.

Later in a field study, the same authors identified constraints across Air Force jobs and developed a questionnaire for military use. They hypothesized general influences of

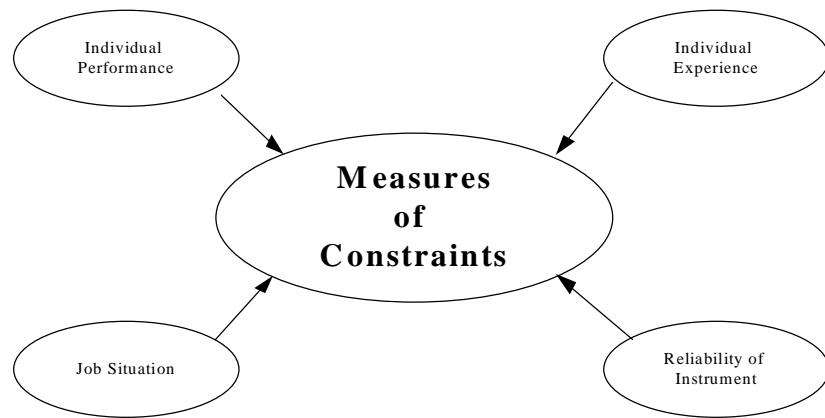
constraints on performance; however, constraints were found to have little adverse effect on performance in the seven AFSs (Air Force Specialties) they studied. It first appeared that field studies and laboratory studies in this area did not agree, but later work by O'Connor et al. found that constraints did affect performance in actual organizations (1984b: 670). This study used a significantly larger sample and the subjects were in select, but diverse, career fields.

Dougherty (1995) later examined constraint-performance relationships by suggesting that the instrument developed by O'Connor et al. (1984a) may be useful for determining the greatest inhibitors and thus help focus managers' improvement efforts. He examined the relationships presented in Figure 1, by hypothesizing that personal abilities, such as Air Force experience, skill and work experience, as well as constraints, directly enhance or inhibit observable duty performance.



**Figure 1**  
**Constraints-Outcome Linkage**  
**(Dougherty, 1995: 2)**

The current research builds on Dougherty's study. It analyzes the measurement properties of situational factors to evaluate their usefulness in guiding performance improvement efforts. Figure 2 depicts the contributors to the measurement of constraints including individual performance and experience as well as the job situation and the reliability of the measurement instrument.



**Figure 2**  
**Contributors to Measures of Constraints**

## Purpose

The purpose of this study is to determine if situational constraints inhibit the work performance of aerial port technicians, and whether or not they provide managers with information that is reliable enough and specific enough to direct continuous process improvement efforts. This research will investigate the usefulness of constraint measures in helping managers identify areas that may require improvement.

## **Problem Statement**

Managers need a valid instrument for measuring situational constraints within work groups to direct management attention and guide process improvement.

## **Research Question**

Do situational constraints differ across organizational functions and over time?

## **Significance**

The objective of this study is to provide researchers and managers with a tool to gain insight into controllable aspects of their work environment. For example, Dettmer asserts that the situational constraints approach “integrates and focuses [quality efforts] toward the organization’s goal” (1995: 81). A tool that focuses improvement efforts is needed to guide organizational change and ensure that scarce resources are directed towards improving the most serious constraining factors.

## **II. Literature Review**

### **Foundation Research**

Early situational constraint research investigated environmental and organizational factors that seemed likely to affect workers' performance by decreasing their motivation. Peters and O'Connor (1980) extended this research by trying to determine whether or not constraints were direct determinants of performance. They reasoned that no matter how motivated workers were, they might not be able to overcome shortages in manpower, training, supplies, equipment, time or organizational impediments such as red tape.

They first attempted to determine the scope of work-place inhibitors and to categorize them. The authors administered an open-ended questionnaire to local business men and women attending a local School of Management. The survey was designed to present the subjects with samples of behavior allowing the respondents to work backwards to uncover the underlying constraining variables. The authors classified the responses into eight general categories of situational variables expected to affect performance outcomes. The eight categories are listed in Table 1.

Peters, O'Connor and Rudolf's second research study attempted to use these categories to test the hypothesis that "inhibiting situational conditions should have a direct inhibiting effect on performance" (1980: 83-84). Their methodology consisted of 70 graduate and undergraduate students performing specified tasks using standard children's Erector® sets under differing levels and types of constraining factors.

**Table 1**  
**Original Categories of Situation Constraints**  
**(Peters et al., 1980: 82)**

1) Job-related information
2) Tools and equipment
3) Materials and supplies
4) Budgetary support
5) Required services and help from others
6) Task preparation
7) Time availability
8) Work environment

Erector® sets were used because the quality and quantity of work were measurable, the situational variables could be easily manipulated and the skills required were common among college students. Researchers manipulated job-related information (photographs used as blueprints), tools and equipment, materials and supplies as well as task preparation (amount of practice time). For all variables, the tests were designed to hinder performance rather than prevent completion.

The study attempted to uncover relationships between factors that prevent optimal performance, or inhibitors, and the level of reduced performance. Peters, O'Connor and Rudolf showed that "poorer quality work and lower quantity of output were observed in the inhibiting, as compared to the facilitating condition" (1980: 90). It was also identified that "inhibiting conditions tend to both 'lower the ceiling' on performance among better performers and 'lower the floor' among poorer performers" (Peters et al., 1980: 93). A shortfall of the study was finding non-significant differences in the variance of quantity performance between inhibiting versus facilitating conditions. It was hypothesized that if constraints were active inhibitors of performance, then differences

in individual ability would be restricted under hindering conditions, thus reducing the variance.

## **Continuing Research**

The next major study analyzing the use of situational constraints was a larger survey of managers in a convenience store organization (O'Connor et al., 1984b). The authors claimed their study provided the first real evidence that a strong correlation exists between situational constraints and individual performance. This field level investigation was designed to test the impact of situational constraints on three areas: performance, affective outcomes and turnover rates. In order to collect enough data for the eight categories of constraints developed during Peters and O'Connor's 1980 research, 1450 managers were surveyed, all of whom were employed by a nation-wide convenience store organization. Managers were employed in three distinct levels: store managers, supervisors, and district managers. The authors understood that different organizations have different processes and goals, which implies that the effect of constraining factors could vary if several organizations were included in the study. One benefit of using subjects employed by the same company with similar jobs was that performance characteristics probably were fairly consistent throughout the sample.

Managers responded to a questionnaire that consisted of the measures developed during Peters and O'Connor's 1980 laboratory research and field tested in 1984. Each subject answered 88 questions, and the 3 most highly correlated answers were chosen to represent each of their 22 constraint dimensions. They reported acceptable internal

consistencies with Cronbach's alphas ranging from .67 to .93 (O'Connor et al., 1984b: 666). A single composite score to represent the overall level of constraints was also calculated as an overall assessment of working conditions.

Results indicated that the performance of low- and medium-constrained managers were significantly better than the outcomes of the highly constrained managers (O'Connor et al., 1984b). Also, the managers facing lower constraints had a much higher mean level of job satisfaction than their counterparts. As hypothesized , those facing high levels of constraints in their jobs reported being more frustrated than those experiencing the lowest constraints. The authors reported a significant correlation between overall constraints and performance with  $r = -.12$ ,  $p < .001$ ,  $N = 1,450$  (O'Connor et al, 1984b: 667). The authors expected a much larger magnitude in the correlation between constraints and performance and state,

It may be that raters, when they recognize that employees are working under highly constraining conditions, tend to compensate for such conditions by giving these employees higher performance ratings than they would have received for the same 'objective' performance under low situational constraint conditions.  
(O'Connor et al., 1984b: 670)

The difference between subjective and objective performance measure is a key criterion issue in this research. If truly unbiased output measures were available, the correlation between constraints and performance is expected to be stronger based on this hypothesis. O'Connor and associates' work concluded by suggesting that further research should concentrate in areas with more severe levels of constraints, because the magnitude of the constraints may have impacted the correlation between them and performance.

Later work by Steel and Mento (1986) investigated the effect of constraints on job performance as measured by subjective and objective outcomes. Their hypothesis was that situational constraints would affect both performance criteria. They surveyed 438 branch managers of a large financial institution. Objective measures were selected on which each of the managers could be rated: loan growth, account growth, past due control, charge off control, profitability and total bonus points. Once again, the focus was on individuals in similar job situations. Constraints that these managers faced were gathered using questions focused on four areas: job-induced obstacles, interpersonal/social obstacles, environmental constraints and policy/procedural constraints. Steel and Mento assumed that overall constraints would provide a more reliable means of sub-grouping sample members. They used overall constraints to sort subjects into highly constrained and minimally constrained groups by dichotomizing scores about the mean.

Steel and Mento showed that constraints accounted for 10 percent of the variance in Feedback-based Self-Appraisal ratings (1986: 263). They suggested that their results could have been the result of higher constraint levels than those faced by subjects in previous studies. They reported that even under “very modest constraints ... performance relationships were observed for the objective measures” (1986: 263). Even though these researchers found higher correlations between constraining factors and objective performance measures, supervisors should be cautioned that such objective measures fail to effectively discriminate between employees, especially when differences are small. Still, after all these studies, Steel and Mento noted that, “The potential predictive utility of

situational factors ... is a virtually untapped resource for organizational researchers bent upon understanding (and predicting) performance variability" (1986: 264).

### **Applications in Air Force Environments**

Several studies evaluating the impact of situational constraints have been conducted in military settings. Studies conducted with Air Force personnel include: O'Connor, Eulberg, Peters and Watson (1984a), Kane (1981) and most recently Dougherty (1995).

The first major study into the effects of situational constraints within the Air Force was performed by O'Connor et al. (1984a). This study attempted to identify, measure and assess the impact of work performance inhibitors in the Air Force. Research was conducted in four phases: identifying constraining categories, developing a questionnaire, testing hypotheses of constraining factors limiting work performance and measuring constraints' effect on propensity to stay or leave the service.

Phase I of O'Connor et al.'s research began with an open-ended survey of 256 airmen assigned throughout the Air Force, that asked respondents to report factors that promote or inhibit work performance. The authors categorized responses into the 14 dimensions listed in Table 2. The authors noted that some categories differed from previous research that took place in civilian settings. A few categories were new: Red Tape and Transportation were important in the military sample while Budgetary Support did not seem to impact the airmen.

**Table 2**  
**Situational Constraint Dimensions**  
**(O'Connor et al., 1984a: 9-10)**

Constraint Dimension	Description
1. Training .....	Lacked training necessary
2. Materials and Supplies ...	Lacked necessary material and supplies
3. Time .....	Lacked sufficient time to do job
4. Tools and Equipment .....	Unable to perform job due to lack of proper tools and equipment
5. Planning or Scheduling ...	Could not complete job due to having to wait for others
6. Cooperation from Others ..	Unable to obtain the help from others needed to complete job
7. Personnel .....	Insufficient number of people present to get the job done
8. Physical Conditions .....	Work environment was too hot, too cold, or had too much precipitation
9. Policies and Procedures ..	Uncertainty concerning correct policies or procedures inhibits performance
10. Red Tape .....	Some aspect of rules and regulations interfered with job completion
11. Transportation .....	Could not get to the job site
12. Job Relevant Authority ...	Could not do the job because of a lack of needed authority
13. Job Related Information ..	Didn't have enough or had wrong information
14. Forms .....	Lack of proper forms interfered with completing the job

A questionnaire was developed to attempt to measure the degree to which each of the constructs inhibits individual performance. It consisted of 57 questions covering the

14 dimensions. A total of 3,125 surveys were distributed to airmen throughout the Air Force on a random basis. A response rate of 43 percent was obtained from this voluntary survey. Internal consistency was calculated with alphas ranging from 0.70 to 0.91 for the 14 constraint dimensions (O'Connor et al., 1984a: 16).

The authors reported no meaningful differences between levels of constraints reported by personnel in various career fields. There was also evidence that constraints affected job satisfaction. A detailed analysis of a single career field, Medical Specialists assigned to four USAF hospitals, "revealed little support for the idea that constraints interact with individual ability/motivation levels to affect either affective reactions to the job or rated job performance" (1984: 59). Thus it was suggested that the instrument validly measured constraints, but constraints were not useful predictors of individual performance ratings. However, because subjects were consolidated across organizations, the situational constraints may not have affected each respondent in the same way -- the situations they worked in may have differed. Even when they analyzed data for the single career field, the authors did not account for the subjects' differing locations.

Related research was conducted independently by Kane (1981). He personally observed aircraft maintenance personnel in order to identify and categorize situational factors which influence all workers. Although he used a very limited sample (17 individuals), the findings suggest that external influences may have significant effects on individual performance. Kane concluded that controlling environmental distractions could lead to significant performance gains.

In a more recent study, Dougherty (1995), the effects of constraints in an Aerial Port squadron were examined. An Aerial Port squadron is the Air Force unit responsible for processing, loading and unloading air cargo and passengers. He found that constraints had little impact on subjective performance ratings. Correlations between constraints and overall performance ranged from -.02 to -.11 (1995: 32). However, because the squadron consists of several diverse functions (i.e., cargo processing, flightline cargo loading and unloading, fleet service, personnel processing, and traffic management), analysis at the unit level may have combined dissimilar groups, ignoring differences in their environment and missions. Therefore, aggregation of the groups may have reduced the correlation between constraints and performance.

### **Need for Further Research**

Studies have examined situational factors as possible predictors of job performance, but only found weak support. However, in ignoring differences in the work environments faced by different work units, researchers may have missed their impact. The instruments developed to measure constraints may also be useful for other purposes. It appears that managers could use information about constraints to guide improvement efforts.

### **III. Method**

Initial data were obtained from a survey administered by Dougherty in June, 1995.

A second survey was administered March, 1996, at the same location.

#### **Sample and Setting**

The setting for the study was a large Air Force aerial port squadron in the Western United States. An aerial port squadron is an Air Force unit responsible for the receiving of outbound air cargo as well as processing inbound air cargo. The squadrons are also responsible for all troop movements and space-available passenger travel on both military aircraft and civilian charters that originate or end at the base. Aerial port squadrons ship and receive military members' personal property (household goods) through their Traffic Management flights.

Subjects voluntarily participated in both studies. The first administration, June, 1995, encompassed 227 available airmen between the rank of airman through technical sergeant. Approximately 82 percent of the target group elected to participate. A similar group of subjects in the same organization completed the same instrument in March, 1996. In total, 180 airmen and junior noncommissioned officers (NCOs) participated representing an 80 percent response rate; 110 of these had participated in the first survey.

The typical respondent was a male (81 percent), between the ages of 20 and 25 years. About 3 percent of the respondents had earned a 4-year college degree with 13 percent having a 2-year degree. A significant portion of the volunteers (76 percent) had been in the Air Force for 5 years or less, and most were assigned to their present work

center for 4 months or less (78 percent). However, many had been assigned to the squadron for a longer period of time.

## **Instruments**

*Situational Constraints.* Two measures of situational constraints were used. The first set of questions was taken from the original instrument developed by O'Connor et al. from their 1984 research on work performance constraints. It consisted of 57 items covering 14 categories of constraining factors listed in Table 2. Responses ranged on a 5-point scale from *Not at All Accurate* to *Completely Accurate*.

The second instrument was drawn from Steel and Mento (1986) and modified to represent the military environment. It included four questions that dealt with job-induced obstacles, interpersonal or social obstacles, constraints in the physical job environment and constraints from organizational policies and procedures. The same 5-point response scale was used to maintain consistency within the questionnaire. The Work Environment Factors Survey II can be found in Appendix A.

*Performance Ratings.* For each volunteer, at least one, and in most cases two direct supervisors provided ratings for task performance, interpersonal skills and motivational level, as well as the individual's overall performance. Responses were on a 5-point scale ranging from *Much below average* to *Much above average*. The supervisors' survey is included in Appendix B. All raters were noncommissioned and commissioned officers, except for one senior civilian employee. NCOs ranged from Staff

Sergeants to Master Sergeants, but in all cases were at least one grade higher and in a direct supervisory role with respect to each of their ratees. Multiple ratings were averaged.

*Demographic Data.* Both the Work Environment Factors Survey and the Supervisor Performance Form asked volunteers eight questions to gather information about biographical data on the respondents. Questions cover topics including sex, age, race, level of education, time in military service, rank, time in work center and duty skill level. Respondents were also coded by duty section representing the eight separate work centers and by duty shift (Day shift -- 6:30 am to 3:30 pm, Swing shift -- 3:00 pm to 12:00 midnight, Grave shift -- 11:30 pm to 8:30 am). Demographic questions are in the beginning of each survey included in Appendixes A and B with subject and rater data for the March, 1996, survey summarized in Appendixes C and D.

*Administration.* The March, 1996, survey was administered personally by the present researcher. During an initial meeting with each section chief (usually the highest ranking NCO), a time and place was scheduled for personnel on each of their shifts to take the survey. Most times were planned for the beginning of normal duty hours; however, some sections requested the end of their normal shift. Before taking the survey, volunteers were given a brief overview of the survey and its purpose. Respondents took 15-25 minutes to fill out the Work Environment Factors Survey, while the raters required 15-50 minutes depending on the number of personnel they supervised. The researcher

was available to answer questions. Subject numbers were pre-assigned to all individuals in the squadron and coded on the subjects' score sheets for later compilation with supervisory performance ratings.

## **Analysis Method**

*Internal Consistency.* First, in order to assess the level at which responses to the questions in each category were consistent, Cronbach's alphas were computed for each of the 14 constraint categories. A coefficient alpha greater than .70 is generally considered to indicate a pattern of responses consistent enough that results can be considered reliable within a particular sample (Nunnally, 1978: 245). Alphas ranged between .79 and .95 for this survey and from .73 to .92 for the first survey (Dougherty, 1995: 30).

*Multivariate Analysis of Variance (MANOVA).* In order to determine if main effects of constraints within time and sections exist, a Time x Section x Constraint repeated measures MANOVA was performed. Because main effects were significant, univariate analyses (repeated measures ANOVAs) were performed to determine which differences were important. These included differences among mean responses from time 1 and time 2 for each section and among the eight work groups at each time.

*Longitudinal Analysis.* This study is unique in that the same organization was studied on two separate occasions. As reported earlier, the large portion of personnel (110 out of 227) volunteered for both surveys. Based on the existence of main effects of

constraints for the repeated surveys, repeated measures ANOVAs were used to calculate the significance of the hypothesis that the mean effect of constraints differed between time periods. If differences existed, relative comparisons were made through rankings.

*Group Rankings.* A revealing way of viewing the levels of constraints is to rank order the sections. By assigning ranks of 1 to the section with the lowest mean constraint (e.g., that particular factor impacts this section the least when compared to the other sections being studied), then continuing from least impact to the highest impact, a ranking of influences were generated. Using this information, it is hypothesized that within a given constraint dimension, the greatest benefit in organizational performance can be gained by resolving the cause of the constraint within the highest ranked section. Where those differences do exist, managers then have the knowledge of not only which inhibitors are the highest overall, but where to first direct available resources to attempt to produce the most benefit.

## **IV. Results**

### **Usefulness of Instrument**

Intercorrelations between the constraint variables show that the majority of constraints are highly correlated with each other (Tables 3 and 4). The one exception is weather. Though significantly correlated with each of the other variables ( $p < .01$ ), intercorrelations with weather are approximately half the strength of the others. This may be explained because weather is not influenced by organizational factors, although it may influence productivity. This constraint category is important because the organization can use, for example, protective clothing, shelter, vehicles or processes to minimize the effects of weather. Several other correlations are worth mentioning: cooperation and time ( $r = .71$  for survey 1 and  $.75$  for survey 2 -- when cooperation problems exist, extra time is required to complete the job), information and policies ( $r = .77$  for survey 1 and  $.87$  for survey 2 -- lack of proper information occurs when restrictive organizational policies exist), supplies and tools ( $r = .81$  for survey 1 and  $.87$  for survey 2 -- improper tools for a job are usually associated with poor availability of supplies) and forms and policies ( $r = .74$  for survey 1 and  $.70$  for survey 2 -- paperwork is a hindrance when encumbering policies are found).

**Table 3**  
**Intercorrelations of Constraint Variables**  
**June 1995**

	SCHED	TIME	COOP	WX	TRANS	AUTH	POLICY	TOOLS	PERS	SUPPLY	INFO	TRAIN	RTAPE	FORMS
Scheduling	( .73)													
Time	.70	( .79 )												
Cooperation	.65	.71	( .91 )											
Weather	.40	.39	.29	( .87 )										
Transportation	.42	.51	.46	.54	( .89 )									
Authority	.65	.61	.65	.41	.42	( .79 )								
Policy	.67	.64	.62	.40	.56	.71	( .92 )							
Tools	.69	.74	.69	.39	.55	.60	.70	( .89 )						
Personnel	.50	.58	.53	.25	.37	.44	.47	.53	( .78 )					
Supplies	.73	.70	.68	.37	.51	.61	.73	.81	.44	( .81 )				
Information	.72	.74	.75	.34	.47	.63	.77	.77	.52	.74	( .87 )			
Training	.71	.63	.69	.29	.49	.65	.69	.70	.50	.66	.71	( .76 )		
Red Tape	.47	.45	.37	.49	.49	.54	.65	.44	.40	.48	.49	.48	( .88 )	
Forms	.63	.65	.58	.33	.47	.62	.74	.73	.34	.79	.68	.61	.54	( .86 )

N = 184. Cronbach's alphas shown on the diagonal. All correlation coefficients, *r*, are significant at *p* < .01.

**Table 4**  
**Intercorrelations of Constraint Variables**  
**March 1996**

	SCHED	TIME	COOP	WX	TRANS	AUTH	POLICY	TOOLS	PERS	SUPPLY	INFO	TRAIN	RTAPE	FORMS
Scheduling	( .79 )													
Time	.73	( .83 )												
Cooperation	.67	.75	( .94 )											
Weather	.37	.39	.41	( .91 )										
Transportation	.64	.65	.63	.39	( .90 )									
Authority	.73	.73	.72	.45	.59	( .84 )								
Policy	.73	.68	.74	.40	.61	.79	( .95 )							
Tools	.70	.69	.69	.44	.64	.71	.72	( .90 )						
Personnel	.61	.68	.66	.37	.45	.69	.59	.60	( .87 )					
Supplies	.72	.66	.69	.43	.66	.69	.72	.87	.60	( .87 )				
Information	.75	.78	.80	.39	.67	.75	.87	.79	.68	.77	( .92 )			
Training	.73	.67	.71	.31	.58	.68	.66	.66	.69	.64	.73	( .82 )		
Red Tape	.70	.64	.60	.29	.52	.71	.77	.67	.59	.63	.71	.68	( .93 )	
Forms	.66	.60	.61	.32	.61	.59	.70	.68	.54	.75	.71	.59	.61	( .92 )

N = 180. Cronbach's alphas shown on the diagonal. All correlation coefficients, *r*, are significant at *p* < .01.

## Main Effects

The MANOVA testing for the main effects of constraints indicated that the 14 constraint dimensions do differ across time and work centers (Hotelling's  $F_{50,1} = 10.99$ ,  $p < .01$ ). Across time periods, sections experienced significantly different levels of constraints. Within time periods, reported levels of constraints varied between sections (Hotelling's  $F_{78,8} = 1.45$ ,  $p < .02$ ). This is important since it shows that situational factors are not static.

## Effects of Personal Characteristics

ANOVAs were used to examine the possibility that the level of constraints individuals' experienced could be explained by differences in work history and status. Table 5 summarizes the four dimensions that are hypothesized to affect either the level of constraints imposed on individuals or their perceptions of the constraints. The first independent variable, skill level, is assigned to an individual based on demonstrated abilities in a particular task area. A second variable is an individual's experience working in the Air Force. Measured in years, work experience is a measure of knowledge and is reflective on an individual's experience in dealing with the organization. This may differ from skill level when an individual has changed career fields or progressed at different rates through the technically-oriented skill levels. Air Force experience should influence a subject's ability to handle organizational issues like policies, cooperation and red tape. The third variable studied was grade: an individual's rank represents his or her level of authority within the military structure. This measure of authority should alter a

**Table 5**  
**Correlations of Constraints with Personal Characteristics**  
**March 1996**

Constraints	Skill Level	Experience	Grade	Time in Work Center
Scheduling	.01	-.07	-.02	.22**
Time	-.09	-.17*	-.16*	.26**
Cooperation	-.04	-.14	-.07	.29**
Weather	-.15*	-.24**	-.28**	.13
Transportation	-.07	-.14	-.14	.13
Authority	-.04	-.15	-.09	.32**
Policy	-.06	-.14	-.07	.24**
Tools	-.03	-.12	-.10	.22**
Personnel	-.02	-.10	-.06	.32**
Supplies	-.00	-.10	-.05	.20**
Information	-.02	-.10	-.05	.28**
Training	.04	-.03	.01	.23**
Red Tape	-.02	-.08	-.05	.19*
Forms	.01	-.08	-.03	.17*
Job Induced Constraints	.06	.03	.05	.21**
Interpersonal obstacles	-.03	-.09	-.04	.19*
Environmental obstacles	-.13	-.18*	-.20**	.11
Admin or policy constraints	.06	.03	.06	.22**
	N = 179	N = 179	N = 179	N = 175

\* p < .05, \*\* p < .01 (two-tailed).

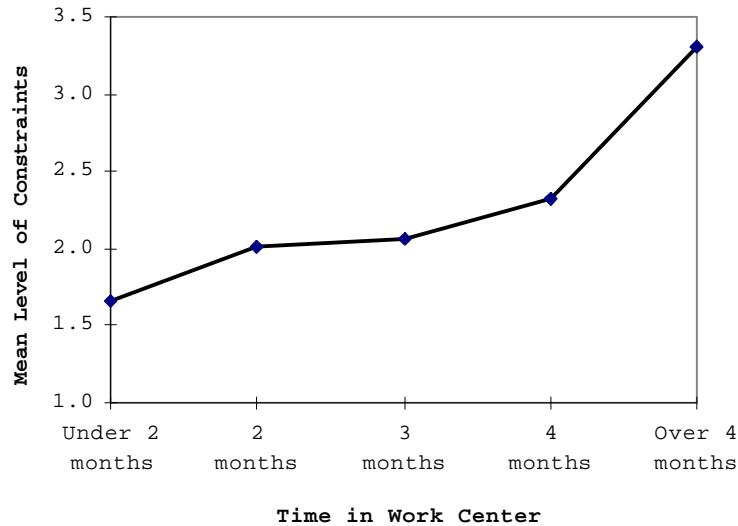
subject's performance through gaining needed cooperation, obtaining proper authority and acquiring necessary transportation and equipment. In most cases, these three factors are highly correlated. A final independent variable is time assigned to the work center. This variable should indicate how familiar an individual is with his or her current organization's policies and procedures. As noted previously, a large majority of the subjects had been assigned to their sections for four months or less when the constraints were last measured;

therefore, their lack of knowledge of tasks, or of the organization itself, may have contributed to their perceptions of constraints.

Very few constraint categories were significantly correlated ( $p < .05$ ) with skill level, experience or grade. Where correlations were significant, they tended to be negative. Time in work center, which was positively correlated with 12 of the 14 constraints ( $p < .05$ ), will be discussed. An example of the first three variables is weather which is significantly correlated to skill level ( $r = -.15$ ), experience ( $r = -.24$ ) and grade ( $r = -.28$ ). This suggests that individuals of higher rank are less affected by weather than more junior people. This could be because higher ranked personnel are likely to spend less time outdoors and more time performing office work. Also, more senior personnel may have less problem obtaining transportation, exercising authority and avoiding red tape.

The correlations between situational constraints and time in work center may be partially explained by the way new arrivals are assimilated into the unit. Newly assigned airmen go through an orientation period of several weeks during which the tasks, resources and responsibilities are explained. During this introduction period, few responsibilities are usually assigned; therefore limited resources may be less of a hindrance. As time progresses, individuals become more and more accountable for task completion, and with increased knowledge of the resources required to complete tasks, should become increasing aware of those resources which inhibit performance. Using overall constraints as a measure of this process, the level of constraints reported by respondents with various numbers of months assigned to a work center is depicted in Figure 3. A significant

difference in means exists between the newly assigned personnel and those working within the same section for over 4 months ( $p < .01$ ,  $N = 172$ ).



**Figure 3**  
**Overall Constraints versus Time in Work Center**  
**March 1996**

The only exceptions to this correlation are weather and transportation, as seen in Table 5. These two dimensions of situational constraints appear to affect workers equally no matter how long they have served in the duty section. It should be no surprise that weather affects everyone to some extent, therefore little orientation is necessary. Transportation also appears to affect workers equally without regard to the length of time they have been assigned to the work center.

As in previous studies there were no significant correlations between performance and constraint levels at the organizational level ( $-.09 < r < .05$ ,  $N = 126$ ,  $p > .05$  for

O'Connor et al.'s 14 constraint dimensions). Sample sizes did not permit analysis at the work group level.

### **Longitudinal Results**

The mean values of reported constraints for both surveys show some similar levels, but others which changed significantly. Table 6 lists means for each constraint category by survey for comparison (1 = June, 1995 survey, and 2 = March, 1996 survey). Significant differences exist between the mean perceived constraints in 12 of the 14 dimensions which indicates that there is a dynamic environment in an aerial port. In all 12 significantly different cases, the levels of constraints were lower in the second survey. Constraints did not differ for Steel and Mento's dimensions. Test/retest correlations for those taking both surveys and having ratings for both time periods ( $N = 73$ ) are also listed in Table 6.

**Table 6**  
**Comparison of Constraints Between Surveys**  
**June 1995 and March 1996**

Constraints	Mean	Value	Standard Deviation	Cases (N)	Difference between means (p-value)	Test/Retest Correlation (N = 73)
Scheduling - 1	2.52	1.14	184			
- 2	2.15	.99	179	.00**	.14	
Time - 1	2.58	.99	184			
- 2	2.35	.95	180	.02*	.47**	
Cooperation - 1	2.55	1.04	184			
- 2	2.27	.99	179	.01**	.48**	
Weather - 1	2.64	1.30	184			
- 2	2.24	1.09	179	.00**	.08	
Transportation - 1	2.49	1.34	183			
- 2	1.90	.96	178	.00**	.47**	
Authority - 1	2.48	1.04	183			
- 2	2.35	1.08	180	.26	.23	
Policy - 1	2.48	1.06	184			
- 2	2.29	1.08	180	.08	.39**	
Tools - 1	2.49	1.03	184			
- 2	2.26	.92	180	.02*	.36**	
Personnel - 1	3.18	1.17	184			
- 2	2.86	1.16	180	.01**	.15	
Supplies - 1	2.40	1.00	184			
- 2	2.11	.88	180	.00**	.32**	
Information - 1	2.51	.92	184			
- 2	2.20	.93	180	.00**	.54**	
Training - 1	2.49	.94	184			
- 2	2.23	.94	180	.01**	.31**	
Red Tape - 1	2.64	1.28	184			
- 2	2.25	1.12	178	.00**	.18	
Forms - 1	2.28	1.07	184			
- 2	1.81	.90	178	.00**	.29*	
Job Induced - 1	3.07	1.15	183			
- 2	3.11	1.06	177	.72	.26*	
Interpersonal - 1	2.80	1.09	183			
- 2	2.72	1.07	177	.48	.18	
Environmental - 1	2.73	1.07	183			
- 2	2.86	1.17	177	.26	.43**	
Admin/policy - 1	2.80	1.16	183			
- 2	2.97	1.22	177	.18	.33**	

\* p < .05, \*\* p < .01 (two-tailed).

## Differences Between Groups

The analysis of variance of each constraint dimension by section revealed that significant differences are present within the aerial port. Table 7 presents the results for both studies giving mean levels of constraints, their standard deviation and the significance level of the differences between means. The first survey found 8 of the 14 dimensions with significant differences between sections ( $p < .05$ ). However, the second survey found significant differences in all constraints ( $p < .01$ ). For example, reported constraints decreased in the Air Passenger flight, the Ramp Services section and the Passenger and Personal Property Movement section. On the other hand, some constraints increased in the Cargo Processing section. Thus, in addition to the significant drop in overall constraints faced by the Aerial Port over the intervening eight months, it also appears that the impact of constraints on the sections shifted. This is evidence that performance constraints do vary over time and place.

Results from Steel and Mento's 4-point scale are less impressive. Two of the four categories indicated differences between sections in the second survey with the Passenger and Personal Property section on the low end and Fleet Services flight and the Special Handling section on the highly constrained end. Lack of many differences may be due to aggregated factors which could be more difficult for workers to judge.

**Table 7**  
**Longitudinal Comparison of Mean Constraints by Section**

Section		Passenger		Fleet		Ramp		Cargo		Docs		Personnel	
	1	2	1	2	1	2	1	2	1	2	1	2	Prop.
	Survey	19	30	22	27	36	25	5	10	52	60	8	7
Median N Constraints	-	2.74 (1.07)	1.70 (0.65)	2.71 (1.20)	2.22 (0.93)	2.65 (1.19)	1.64 (0.64)	2.27 (1.12)	2.20 (0.79)	2.47 (1.06)	2.71 (0.95)	2.29 (0.95)	2.41 (0.93)
Scheduling	-	2.54 (0.70)	1.98 (0.65)	2.71 (0.78)	2.20 (0.92)	2.56 (0.73)	2.13 (0.73)	2.50 (1.45)	2.28 (1.03)	2.45 (1.00)	2.87 (0.77)	2.34 (0.77)	2.85 (0.94)
Time	-	2.54 (0.70)	1.95 (0.78)	2.73 (1.02)	2.17 (1.04)	2.70 (0.99)	2.13 (0.78)	2.27 (1.15)	2.40 (1.03)	2.46 (1.00)	2.70 (0.99)	2.15 (0.91)	2.37 (0.95)
Cooperation	*	2.65 (0.56)	1.95 (0.78)	2.73 (1.02)	2.17 (1.04)	2.70 (0.99)	2.13 (0.78)	2.27 (1.15)	2.40 (1.03)	2.46 (1.00)	2.70 (0.99)	2.15 (0.91)	2.35 (0.97)
Weather	**	2.63 (0.83)	2.09 (0.79)	2.71 (1.01)	2.17 (1.18)	2.35 (1.35)	2.11 (1.18)	2.33 (0.55)	2.17 (1.18)	2.53 (1.36)	2.48 (1.08)	2.04 (0.81)	2.15 (0.11)
Transportation	-	2.44 (0.77)	1.91 (0.72)	2.67 (1.15)	1.81 (0.88)	2.63 (1.03)	1.53 (0.55)	1.40 (0.55)	1.50 (0.71)	2.41 (1.21)	2.39 (1.21)	2.33 (1.21)	1.37 (0.42)
Authority	**	2.57 (0.81)	2.09 (0.85)	2.61 (0.87)	2.32 (0.87)	2.35 (0.82)	2.22 (0.81)	2.53 (1.09)	2.13 (0.53)	2.50 (1.06)	2.84 (1.16)	2.21 (0.64)	2.31 (0.83)
Policy	-	2.54 (0.67)	1.87 (0.73)	2.77 (1.10)	2.52 (1.08)	2.63 (0.98)	2.11 (0.98)	2.77 (1.07)	1.87 (1.00)	2.35 (1.05)	2.74 (1.05)	2.04 (0.81)	2.15 (0.11)
Personnel	***	3.00 (0.84)	2.48 (1.04)	3.12 (0.98)	2.63 (1.01)	2.94 (1.04)	2.63 (1.01)	3.13 (1.61)	3.50 (1.07)	3.50 (1.31)	3.37 (1.31)	2.99 (1.31)	3.13 (1.13)
Supplies	*	2.65 (0.75)	1.84 (0.70)	2.73 (0.80)	2.23 (0.83)	2.44 (0.81)	1.83 (0.81)	2.15 (0.63)	2.15 (0.81)	2.31 (0.91)	2.36 (0.91)	1.83 (0.64)	1.33 (0.59)
Information	-	2.52 (0.72)	1.94 (0.77)	2.73 (0.84)	2.15 (0.84)	2.69 (0.65)	2.00 (0.65)	2.33 (0.43)	2.03 (0.47)	2.39 (0.85)	2.62 (1.06)	2.48 (0.70)	2.52 (0.42)
Training	-	2.80 (0.95)	1.86 (0.71)	2.58 (0.95)	1.87 (0.71)	2.61 (0.95)	2.12 (0.95)	2.15 (1.01)	2.30 (0.79)	2.39 (0.93)	2.69 (0.62)	1.90 (0.70)	2.86 (0.79)
Red Tape	*	2.70 (0.87)	1.88 (0.94)	2.68 (1.03)	2.15 (0.93)	2.23 (1.02)	2.20 (1.02)	2.07 (1.00)	2.48 (1.33)	2.73 (1.26)	2.87 (1.65)	1.83 (1.07)	2.63 (0.62)
Forms	***	2.77 (0.95)	1.52 (0.62)	2.48 (1.02)	1.91 (0.87)	2.35 (1.07)	1.93 (0.79)	2.17 (0.72)	2.05 (1.15)	2.17 (0.97)	1.71 (0.95)	1.33 (1.01)	1.96 (0.67)
Job Induced	-	2.63 (0.88)	3.00 (1.08)	2.95 (1.21)	3.27 (1.04)	3.22 (1.02)	2.96 (1.20)	2.00 (1.22)	3.00 (0.67)	3.08 (1.03)	3.23 (1.03)	3.10 (1.29)	3.33 (1.16)
Interpersonal	-	2.42 (0.84)	2.55 (1.09)	2.95 (1.09)	2.58 (1.09)	2.97 (1.00)	2.46 (1.22)	2.20 (1.64)	2.90 (1.20)	2.73 (1.17)	3.03 (1.01)	2.25 (0.89)	2.60 (0.87)
Environmental	-	2.63 (1.12)	2.59 (1.05)	2.86 (1.42)	2.85 (1.19)	3.06 (0.98)	2.72 (1.04)	2.63 (1.21)	1.80 (1.30)	2.40 (1.08)	2.58 (1.11)	2.63 (0.74)	2.00 (1.09)
Administrative	-	2.63 (1.12)	2.59 (1.05)	2.86 (1.42)	2.85 (1.19)	3.06 (0.98)	2.72 (1.04)	2.63 (1.21)	1.80 (1.30)	2.40 (1.08)	2.58 (1.11)	2.63 (0.74)	2.00 (1.09)

— Means are not significantly different between sections ( $p > .05$ ).

At least one mean is significantly different between sections ( $.01 < p < .05$ ).

\*\* At least one mean is significantly different between sections ( $p < .01$ )

Cargo Processing section  
Air Passenger flight

- Fleet Service flight  
- Docs - Documentation section

Passenger and Personal Proper  
Communication Section

Freight... Passenger and Freight... Base Cargo Movements section  
Base Cargo... Base Cargo

Hndl.: Special Handling section Base Cargo...Base Cargo Movements section

## **Ranking Differences**

Rankings of relative mean constraints were calculated from the means of Table 7 and shown in Table 8. Highest levels of reported constraints are ranked eighth on the scale of one to eight (total number groups) within each constraint dimension. Once compiled, there are two modes of interpretation: constraints within a selected group or a single constraint among all groups.

First, using the Air Passenger flight's first survey as example and looking down the column, the section reported higher levels of inhibitors to their performance in scheduling and forms as compared to other groups within the aerial port. The flight's personnel availability was relatively good based on the constraint's low ranking. For the flight, scheduling problems and availability of forms improved by survey 2 as compared to other sections. This could be contributed to managerial effectiveness or other contributing factors such as work load or external policy changes. Nonetheless, the personnel assigned to the section believed that they were comparatively less inhibited at time 2.

Second, the table may be used by managers to assist in allocation or redistribution of resources among the groups in their organization. Using personnel as an example constraint, survey 1 reported the highest levels of personnel limitations in the Documentation section and the Passenger and Personal Property Movement section. For example, if additional personnel are available, or reallocation of personnel or work load possible, these sections should be considered first. These sections did improve their personnel problems relative to the other sections over the eight months between surveys.

In March, 1996, it was the Special Handling and Cargo Processing sections that had the most problems with personnel shortages.

**Table 8**  
**Ranking of Mean Constraints by Section**  
**June 1995**

Section Constraints	Pax 1	Fleet 2	Ramp 3	Spec Hndl 4	Cargo 5	Docs 6	Pers Prop 7	Base Cargo 8*
Scheduling	8	7	6	1	5	2	3	
Time	5	7	6	3	2	1	8	
Cooperation	6	8	7	2	5	1	3	
Weather	6	7	8	3	5	1	2	
Transportation	5	8	7	1	3	2	6	
Authority	6	7	8	2	5	3	1	
Policy	5	8	6	1	2	7	3	
Personnel	2	3	1	5	6	8	7	
Supplies	6	7	5	2	3	1	8	
Information	5	8	7	2	1	3	6	
Training	8	5	6	1	3	7	2	
Red Tape	6	5	8	1	2	7	3	
Forms	8	7	6	2	3	1	5	
Job Induced	2	3	6	1	5	8	7	
Interpersonal	3	6	7	1	5	2	8	
Environmental	6	7	8	1	2	3	5	
Administrative	2	5	7	1	3	6	8	

\* No data available in section 8 for analysis. Therefore, median ranking of 4 removed from Survey 1 results in order to compare high constraints (ranks 7 and 8) and low constraints (ranks 1 and 2) among surveys.

Notes: 1 = least constrained section.

8 = most constrained section (rank of 4 not used).

Pax ..... Air Passenger flight.

Fleet ..... Fleet Services flight.

Ramp ..... Ramp Services section.

Spec Hndl .. Special Handling section.

Cargo ..... Cargo Processing section.

Docs ..... Documentation section.

Per Prop .... Passenger and Personal Property Movement section.

Base Cargo .. Base Cargo Movement section.

By highlighting rankings of 7 and 8 (highest levels of constraints exist in this group), focus can be quickly drawn to possible problem areas. Areas in June, 1995, that may have required managerial attention were Fleet Services flight and Ramp Services

section. Fortunately, Table 9 shows that during the intervening eight months both these groups reduced their level of inhibitors as compared to the other groups. However, the Cargo Processing section has increased its constraints in all categories.

**Table 9**  
**Ranking of Mean Constraints by Section**  
**March 1996**

Section	Pax	Fleet	Ramp	Spec Hndl	Cargo	Docs	Pers Prop	Base Cargo
Constraints	1	2	3	4	5	6	7	8
Scheduling	3	6	2	5	8	4	1	7
Time	2	5	3	6	8	4	1	7
Cooperation	2	5	4	6	8	3	1	7
Weather	3	8	6	4	7	1	1	4
Transportation	5	7	4	3	8	2	1	6
Authority	4	6	5	3	8	2	1	7
Policy	4	6	5	3	8	2	1	7
Personnel	3	5	4	8	7	2	1	6
Supplies	4	6	3	5	7	2	1	8
Information	3	6	4	5	8	2	1	7
Training	2	3	5	6	8	4	1	7
Red Tape	3	5	7	4	8	2	1	6
Forms	3	5	4	8	7	2	1	6
Job Induced	3	8	2	5	6	5	1	7
Interpersonal	3	4	2	7	8	1	5	6
Environmental	5	8	4	3	7	2	1	6
Administrative	3	5	4	7	8	2	1	6

Notes: 1 = least constrained section.

8 = most constrained section.

Pax ..... Air Passenger flight.

Fleet ..... Fleet Services flight.

Ramp ..... Ramp Services section.

Spec Hndl .. Special Handling section.

Cargo ..... Cargo Processing section.

Docs ..... Documentation section.

Per Prop .... Passenger and Personal Property Movement section.

Base Cargo .. Base Cargo Movement section.

Different situations existed in March, 1996, as shown in Table 9 which include: overall problems in Fleet Services flight and Ramp Services section diminished, Special Handling section required personnel assistance which may be short-term based on the

previous survey and Special Handling section also has relatively strong documentation inhibitors -- additional training may be required. Another current issue is the dramatic changes in the Cargo Processing section. This may be due to a recent merger of inbound and outbound cargo handling sections (both sections were included in June, 1995, data for section 5 for direct comparison). A longer adjustment period may be required to allow for training and reduction of individuals' uncertainty about their new responsibilities. On a more positive note, the Documentation section appears to have solved personnel and policy issues, while the Base Cargo Movement section reported higher levels of inhibitors among most categories -- an overall assessment of this group may be necessary. Common themes that can be interpreted from the rankings from both surveys include: additional or better vehicles may be required in Fleet Services flight, outside working conditions are also poor for the Fleet Services flight, appropriate authority to operate with other agencies may be necessary for Fleet Services flight and rules and regulations (red tape) inhibit the success of the Ramp Services section.

## **V. Conclusions**

A longitudinal study of situational constraints in an Air Force aerial port squadron revealed that O'Connor et al.'s (1984a) questionnaire reliably and validly measures work inhibitors. This 57-item survey yielded good internal consistencies with Cronbach's alphas above .79 for each of the 14 constraint dimensions. Subjects reported positive comments on the applicability of the categorization of constraints to their jobs. Analysis revealed appropriate correlations between individual characteristics and constraints further adding to the instrument's validity. Multivariate analysis of variance confirmed significant levels of main effects which lead to three significant findings.

First, the amount of time assigned to the work center did have a significant impact on the level of inhibiting constraints. However, subjects with more experience (i.e., higher skill level, more time in service or higher grade) did not report fewer constraints to their duty performance (Table 5). It is suggested that a significant orientation period may exist in that the longer an individual is assigned to a duty section, the more the person may be aware of the factors that promote or inhibit successful task completion as depicted in Figure 3.

Second, consistent with previous studies, no significant correlation was found between performance ratings and perceived constraints. It has been suggested (O'Connor et al., 1984a; O'Connor et al., 1984b; Dougherty, 1995) that supervisors knowingly make adjustments in ratings based on the situational factors their employees face. Therefore, an individual is not punished for not completing a task solely because the correct tools or

equipment are not available. On the contrary, an individual may even receive higher marks when significant obstacles are overcome even if greater performance could have been achieved if the inhibitors were not present. Another possible explanation is that some people are more likely to persist on tasks than others when faced with limited resources.

Third, longitudinal results found that significant changes in situational factors occurred over time. During the intervening eight months between surveys, constraints within the squadron reduced in 12 of the 14 categories (Table 6). This achievement may have been the result of managerial success of the squadron's new quality improvement programs which began between the surveys and are still ongoing.

This research represents the first study exploring the nature of constraint fluctuations through time within a single Air Force aerial port. Levels of inhibitors were found to vary throughout time, and significant differences existed between groups within the organization.

## **Usefulness to Managers**

Within the dynamics of an organization, a manager's role is to continually plan, implement, monitor and react to both internal and external factors. Therefore, through appropriate manipulation of factors that promote or inhibit workers' performance, more efficient operations can be achieved. Regular administration of a survey such as O'Connor et al.'s 57-item questionnaire (1984a) will provide managers with insight into not only what inhibitors may exist, but where and in what relative levels. Then, by ranking groups

where disparities exist, managers can use this information to determine where bottlenecks are present and what types of resources are involved.

## **Further Research**

In order to determine where the greatest results could be gained, development of a method of measuring the effect of constraining factors on performance is desirable. It has been suggested by Steel and Mento (1986) that combining objective measures of performance along with the performance appraisals may provide a more direct, less biased correlation between constraints and performance.

Also, further longitudinal analysis of these subjects, along with tracking detailed managerial policy and resource distribution actions, could provide backing for the overall success of the method. Under such a design, effects of constraints could be compared with inhibitors that exist after each managerial treatment. Along with such a study, it is important for managers to determine an appropriate sample size and frequency of administration that will provide the best results under the specific organizational environment.

Additional studies may attempt to generalize these findings to other military organizations. Although the constraint levels are expected to vary significantly, the managerial interpretation of the 14 dimensions of constraints remain applicable to all military units and may very well be directly transferable to service and production organizations.

**Appendix A: Workers' Survey**

**HQ AMC SPONSORED  
WORK PERFORMANCE RESEARCH STUDY**

**WORK ENVIRONMENT FACTORS SURVEY II**

**for**

**AERIAL PORT PERSONNEL**

1. Please write your name, rank, office symbol, and score sheet number in the spaces provided below.
2. Read the INFORMATION ABOUT THIS RESEARCH STUDY and PRIVACY ACT information.
3. Enter your name on the computer score sheet provided with this booklet.
4. Complete the survey using the computer score sheet provided.

**The success of this project depends on the accuracy of the information you provide.  
Please do your best to be honest. Your responses will be kept confidential.**

Number: \_\_\_\_\_ Name: \_\_\_\_\_ Rank: \_\_\_\_\_

Office Symbol: \_\_\_\_\_

Score Sheet Number: \_\_\_\_\_

**FOR OFFICIAL USE ONLY**

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## INFORMATION ABOUT THIS RESEARCH STUDY

**Thank you for agreeing to participate in this research project.** Your participation in this survey is strictly VOLUNTARY. Your work experience will make an important contribution to the goals of this research project.

**Description of the study:** The goal of this study is to learn how different types of organizational constraints affect work performance.

**Confidentiality of your responses:** This information is being collected for research purposes only. No one in your unit, base, or MAJCOM will EVER be allowed to see your responses. You are welcome to discuss this questionnaire with anyone you choose, but please wait until they have had a chance to participate.

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## PRIVACY ACT STATEMENT

In accordance with AFR 12-35, paragraph 8, the following information is provided as required by the Privacy Act of 1974.

**Authority:** 10 U.S.C. 8012, Secretary of the Air Force; powers and duties; delegation by; implemented by AFR 30-23, Air Force Personnel Survey Program.

**Purpose:** To obtain information regarding the influence of different types of constraints on the performance of Air Force members.

**Routine Use:** To increase understanding of various types of work performance. Data will be grouped prior to analysis. No analyses of individual responses will be conducted and only members of the research team will be permitted access to the raw data. Reports summarizing trends in large groups of people may be published.

**Participation:** Participation is VOLUNTARY. No adverse action will be taken against any member who does not participate in this survey or who does not complete any part of the survey.

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## **BACKGROUND INFORMATION**

Please answer the following questions about your background and job experience. This information will be used to develop a profile of the participants in this study. Your responses will be kept completely confidential. Please record your answers on the computer sheet provided.

---

**1. What is your sex? (choose one):**

- (a) Male
- (b) Female

**2. What is your race? (choose one):**

- (a) White
- (b) Black
- (c) Hispanic
- (d) Asian
- (e) Other

**3. What is your age in years? (choose one):**

- (a) Less than 20
- (b) 20-25
- (c) 26-30
- (d) 31-40
- (e) more than 40

**4. Highest education level completed? (choose one):**

- (a) Did not complete High School
- (b) High School Diploma or GED
- (c) 2-Year College Degree
- (d) 4-Year College Degree
- (e) Other

**5. How many years have you been in the Air Force? (choose one):**

- (a) Less than 2
- (b) 2 to 5
- (c) 6 to 10
- (d) 11 to 15
- (e) more than 15

**6. What is your present grade? (choose one):**

- (a) E-1 or E-2
- (b) E-3
- (c) E-4
- (d) E-5
- (e) E-6 or higher

**7. About how many months have you worked in the same work center? (choose one):**

- (a) Under 2
- (b) 2
- (c) 3
- (d) 4
- (e) 5 or more

**8. What is your skill level? (choose one):**

- (a) 1
- (b) 3
- (c) 5
- (d) 7
- (e) 9

## Describing Your Job

Listed below are a number of items which may or may not describe your present *job situation* in the Air Force. We are interested in the extent to which each of these statements describes your particular job situation. In this section we want to know about your job and not about your attitudes toward that job. Thus, as you complete this questionnaire, think about the job environment you work in, not how you feel about it or what you do in it.

Using the scale below, rate how accurately each statement describes your present job situation in the Air Force. Write the number which represents your rating on the computer score sheet. As you read through the list, you will note that some of the statements are similar. However, no two of them are exactly alike or have exactly the same meaning. You should simply respond to them as they come and not feel any special need to check back to make answers agree. Please be sure to respond to all of the items.

1 Not at all Accurate	2 Somewhat Accurate	3 Fairly Accurate	4 Very Accurate	5 Completely Accurate

9. The Air Force frequently does not provide me with the necessary tools and/or equipment when needed. \_\_\_\_\_ because I have to deal with "red tape." \_\_\_\_\_
10. I often must work with and depend upon others who are not well trained. \_\_\_\_\_
11. I frequently cannot get necessary materials, supplies, and/or parts when I need them. \_\_\_\_\_
12. The information I must have in order to do my job is often not available. \_\_\_\_\_
13. I am frequently given unscheduled activities to work on which keep me from getting my job done. \_\_\_\_\_
14. I never have enough time to finish my duties without rushing. \_\_\_\_\_
15. The cooperation I am supposed to get from others frequently does not help me get my job done. \_\_\_\_\_
16. My job is typically harder to do because I have to make up for a shortage of capable personnel in my unit. \_\_\_\_\_
17. I am often hampered in doing my job by bad weather conditions (too hot, etc.). \_\_\_\_\_
18. It often takes me too long to do my job
19. I often cannot get my job done because policies, procedures, and instructions are changed without enough advance notice. \_\_\_\_\_
20. I cannot get the transportation I need to do my job when I need it. \_\_\_\_\_
21. I frequently do not have enough of the right tools and/or equipment to do my job. \_\_\_\_\_
22. The Air Force has not provided me with enough training to do my job. \_\_\_\_\_
23. The information I need to do my job is frequently wrong when I receive it. \_\_\_\_\_
24. The Air Force does not provide me with the necessary materials, supplies, and/or parts when I need them. \_\_\_\_\_
25. My work doesn't get done because my schedule often gets changed without enough advance notice. \_\_\_\_\_
26. The cooperation I am supposed to receive frequently does not come when I need it. \_\_\_\_\_
27. I typically am not given the time I need to do my job. \_\_\_\_\_

1 Not at all Accurate	2 Somewhat Accurate	3 Fairly Accurate	4 Very Accurate	5 Completely Accurate
_____	_____	_____	_____	_____

28. I often find that I have too much work to do in order to make up for a lack of qualified personnel in my unit. \_\_\_\_\_
28. I often find that I have too much work to do in order to make up for a lack of qualified personnel in my unit. \_\_\_\_\_
29. My job is frequently made more difficult by bad weather conditions (too hot, too cold, too wet, etc.). \_\_\_\_\_
30. My job is often made harder because I am not given enough advance notice about major changes in policies, procedures, and/or instructions. \_\_\_\_\_
31. I often cannot finish my job on time because of "red tape." \_\_\_\_\_
32. The required forms I need to complete to get my job done are often not available. \_\_\_\_\_
33. I often have to wait for a long time to get the transportation I need to do my job. \_\_\_\_\_
34. I often have to follow the instructions of others even though I am in a better position to know what should be done. \_\_\_\_\_
35. I frequently must work with faulty or damaged tools and/or equipment. \_\_\_\_\_
36. The lack of qualified people in my unit typically makes it difficult for me to get my job done. \_\_\_\_\_
37. I am not usually given enough training to handle new duties which are added to my job. \_\_\_\_\_
38. I frequently get job information from others which is inconsistent. \_\_\_\_\_
39. I am frequently provided with the wrong materials, supplies, and/or parts. \_\_\_\_\_
40. Long time delays keep me from getting my job done. \_\_\_\_\_
41. I frequently receive inconsistent policies, procedures, and instructions which make it difficult to do my job. \_\_\_\_\_
42. Too much "red tape" frequently keeps me from getting my job done on time. \_\_\_\_\_
43. I often cannot obtain the forms I need to get my job done. \_\_\_\_\_
44. Continually having to get the approval of others often keeps me from getting my job done. \_\_\_\_\_
45. The Air Force often provides me with tools and/or equipment which are poorly designed for getting my job done. \_\_\_\_\_
46. It is hard for me to get the help from others that I need to do my job. \_\_\_\_\_
47. My job is often made harder because I must follow specific policies, procedures, and instructions which I know to be wrong. \_\_\_\_\_
48. I must work with and depend upon others who are poorly trained to do their jobs. \_\_\_\_\_
49. I frequently have to wait on others to do their jobs before I can finish my own work. \_\_\_\_\_
50. Bad weather conditions (too hot, too cold, too wet, etc.) make doing my job more difficult. \_\_\_\_\_
51. There are frequent delays in getting the transportation I need in order to do my job. \_\_\_\_\_
52. The tools and/or equipment I must work with are often broken. \_\_\_\_\_



53. The cooperation I receive from others is often so poor that it doesn't help me get my job done. \_\_\_\_\_
54. The information I need to do my job is often incorrect when I receive it. \_\_\_\_\_
55. The inconsistent policies, procedures, and instructions I often receive make it difficult for me to get my job done. \_\_\_\_\_
56. The proper forms I need to do my job are often not available. \_\_\_\_\_
57. I am often not able to do my job well because I am not allowed to make those job decisions I can make best. \_\_\_\_\_
58. The equipment I am given is poorly designed for getting my job done. \_\_\_\_\_
59. The replacement materials, supplies, and/or parts I receive are often the wrong ones. \_\_\_\_\_
60. I often do not have the information I must have at work when it is needed. \_\_\_\_\_
61. I often cannot get my work done because I am not told of schedule changes far enough ahead of time. \_\_\_\_\_
62. I often have to wait too long to get the help I need to do my job. \_\_\_\_\_
63. The incorrect policies, procedures, and instructions I often receive make it difficult for me to get my job done. \_\_\_\_\_
64. I frequently have trouble getting cooperation from others who are supposed to help me do my job. \_\_\_\_\_
65. The information I get from others which I need to do my job is often inconsistent. \_\_\_\_\_

## Performance Obstacles and Constraints

Instructions: The next four items represent obstacles and constraints that you may encounter in your work which inhibit good performance. Select the number beside each performance constraint to indicate how frequently it poses a problem for you.

1 Never	2 Rarely	3 Sometimes	4 Often	5 Always
<hr style="height: 10px; border: none; border-top: 1px solid black; width: 20px; margin-left: 0;"/>	<hr style="height: 10px; border: none; border-top: 1px solid black; width: 20px; margin-left: 0;"/>	<hr style="height: 10px; border: none; border-top: 1px solid black; width: 20px; margin-left: 0;"/>	<hr style="height: 10px; border: none; border-top: 1px solid black; width: 20px; margin-left: 0;"/>	<hr style="height: 10px; border: none; border-top: 1px solid black; width: 20px; margin-left: 0;"/>

### **66. Job Induced Constraints**

Definition: Factors in the make-up of the job itself (e.g., rely on other sections) that determine levels of performance.

### **67. Interpersonal or Social Obstacles**

Definition: Represents the quality of interpersonal relationships (e.g., communication climate, cooperation) among individuals who interact with you in the course of your work.

### **68. Environmental Obstacles**

Definition: Factors in the physical job environment (e.g., excessive noise or heat) and in the geographical locale of the work that affect job performance.

### **69. Administrative or Policy Constraints**

Definition: Rules, regulations, and requirements imposed upon an individual by your organization or the Air Force that impede your job performance to a greater extent than other workers doing comparable work in a different organization.

---

This section consists of a number of words that describe different feelings that people experience. Your responses to these questions will help us understand your reactions to recent changes in the Air Force. For each word, indicate on your score sheet the extent that *you* have felt this way during *the past year*.

1 Very Slightly or Not at All	2 A Little	3 Moderately	4 Quite a Bit	5 Extremely
<hr style="height: 10px; border: none; border-top: 1px solid black; width: 20px; margin-left: 0;"/>	<hr style="height: 10px; border: none; border-top: 1px solid black; width: 20px; margin-left: 0;"/>	<hr style="height: 10px; border: none; border-top: 1px solid black; width: 20px; margin-left: 0;"/>	<hr style="height: 10px; border: none; border-top: 1px solid black; width: 20px; margin-left: 0;"/>	<hr style="height: 10px; border: none; border-top: 1px solid black; width: 20px; margin-left: 0;"/>

70. Interested	_____	77. Hostile	_____	84. Nervous	_____
71. Distressed	_____	78. Enthusiastic	_____	85. Determined	_____
72. Excited	_____	79. Proud	_____	86. Attentive	_____
73. Upset	_____	80. Irritable	_____	87. Jittery	_____
74. Strong	_____	81. Alert	_____	88. Active	_____
75. Guilty	_____	82. Ashamed	_____	89. Afraid	_____
76. Scared	_____	83. Inspired	_____		

**Appendix B: Supervisors' Survey**

**HQ AMC SPONSORED  
WORK PERFORMANCE RESEARCH STUDY**

**PERFORMANCE FORM**

**for**

**SUPERVISORS**

**Name/Rank:** \_\_\_\_\_

**Office Symbol:** \_\_\_\_\_ **Duty Phone:** \_\_\_\_\_

**Supervisor Number:** \_\_\_\_\_

**FOR OFFICIAL USE ONLY**

---

## INFORMATION ABOUT THIS RESEARCH STUDY

**Thank you for agreeing to participate in this research project.** Your participation in this survey is strictly VOLUNTARY. Your work experience can make an important contribution to the goals of this research project.

**Description of the study:** The goal of this study is to learn how different types of organizational constraints affect work performance.

**How your responses will be used:** The information you provide will help us understand how various factors make people effective or ineffective in their jobs.

**Confidentiality of your responses:** This information is being collected for research purposes only. No one in your unit, base, or MAJCOM will EVER be allowed to see your responses. You are welcome to discuss this questionnaire with anyone you choose, but please do not discuss the performance ratings you assign with anyone. This information should be considered confidential.

---

## PRIVACY ACT STATEMENT

In accordance with AFR 12-35, paragraph 8, the following information is provided as required by the Privacy Act of 1974.

**Authority:** 10 U.S.C. 8012, Secretary of the Air Force; powers and duties; delegation by; implemented by AFR 30-23, Air Force Personnel Survey Program.

**Purpose:** To obtain information regarding the influence of organizational constraints on the performance of Air Force members.

**Routine Use:** To increase understanding of various types of work performance. Data will be grouped prior to analysis. No analyses of individual responses will be conducted and only members of the research team will be permitted access to the raw data. Reports summarizing trends in large groups of people may be published.

**Participation:** Participation is VOLUNTARY. No adverse action will be taken against any member who does not participate in this survey or who does not complete any part of the survey.

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## BACKGROUND INFORMATION

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Please answer the following questions about your background and job experience. This information will be used to develop a profile of the participants in this study. Your responses will be kept completely confidential.

---

**1. What is your sex? (check one):**

- (a) Male  
 (b) Female

**2. What is your race? (check one):**

- (a) White  
 (b) Black  
 (c) Hispanic  
 (d) Asian  
 (e) Other

**3. How old are you ?**

Years: \_\_\_\_\_

**4. What is the highest education level you have completed? (check one):**

- (a) Did not complete High School  
 (b) High School Diploma or GED  
 (c) 2-Year College Degree  
 (d) 4-Year College Degree  
 (e) Other

**5. How many years have you worked for the Air Force?**

Years: \_\_\_\_\_

**6. What is your military (or civilian) pay grade?**

Grade: \_\_\_\_\_

**7. About how long have you worked in the same work center?**

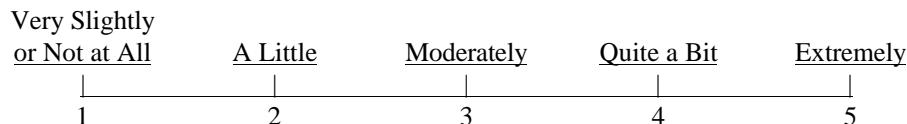
Years: \_\_\_\_\_ Months: \_\_\_\_\_

**8. What is your skill level? (check one):**

- (a) 1  
 (b) 3  
 (c) 5  
 (d) 7  
 (e) 9

---

This section consists of a number of words that describe different feelings that people experience. Your responses to these questions will help us understand your reactions to recent changes in the Air Force. Indicate next to each word the extent that *you* have felt this way during *the past year*.



9. Interested	_____	16. Hostile	_____	23. Nervous	_____
10. Distressed	_____	17. Enthusiastic	_____	24. Determined	_____
11. Excited	_____	18. Proud	_____	25. Attentive	_____
12. Upset	_____	19. Irritable	_____	26. Jittery	_____
13. Strong	_____	20. Alert	_____	27. Active	_____
14. Guilty	_____	21. Ashamed	_____	28. Afraid	_____
15. Scared	_____	22. Inspired	_____		

*Number of Months Observed:*

---

Please enter the total number of months you have *worked with* or *observed* the work of each individual on a regular basis.

**Example:** If you worked with one of them for 2 years and 3 months you would enter 27.

For EACH PERSON, write the number in # MONTHS OBSERVED.

---

*Column 1:*

---

While performing his or her job, how likely is it that this person would persist in overcoming obstacles to complete the task?

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

For EACH PERSON, write the number in COLUMN 1

---

*Column 2:*

---

While performing his or her job, how likely is it that this person would cooperate with others effectively?

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

For EACH PERSON, write the number in COLUMN 2

---

*Column 3:*

---

**While performing his or her job, how likely is it that this person would operate equipment effectively?**

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

**For EACH PERSON, write the number in COLUMN 3**

---

*Column 4:*

---

**While performing his or her job, how likely is it that this person would pay close attention to important details?**

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

**For EACH PERSON, write the number in COLUMN 4**

---

*Column 5:*

---

**While performing his or her job, how likely is it that this person would offer to help others with their work?**

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

**For EACH PERSON, write the number in COLUMN 5**

---

*Column 6:*

---

**While performing his or her job, how likely is it that this person would perform job tasks effectively?**

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

**For EACH PERSON, write the number in COLUMN 6**

---

*Column 7:*

---

**While performing his or her job, how likely is it that this person would take the initiative to solve a work problem?**

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

**For EACH PERSON, write the number in COLUMN 7**

---

*Column 8:*

---

**While performing his or her job, how likely is it that this person would support a co-worker with a problem?**

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

**For EACH PERSON, write the number in COLUMN 8**

---

*Column 9:*

---

**While performing his or her job, how likely is it that this person would demonstrate expertise on the job?**

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

**For EACH PERSON, write the number in COLUMN 9**

---

*Column 10:*

---

**Compared with unit performance standards, this person performs \_\_\_\_\_ .**

- 1 - Much Below Average
- 2 - Below Average
- 3 - Average
- 4 - Above Average
- 5 - Much Above Average

**For EACH PERSON, write the number in COLUMN 10**

---

*Column 11:*

---

**Compared with others of the same rank, how well does this person perform his or her job?**

- 1 - Much Below Average
- 2 - Below Average
- 3 - Average
- 4 - Above Average
- 5 - Much Above Average

**For EACH PERSON, write the number in COLUMN 11**

---

*Column 12:*

---

**Compared with other members of the unit, how much does this person contribute to unit effectiveness?**

- 1 - Much Below Average
- 2 - Below Average
- 3 - Average
- 4 - Above Average
- 5 - Much Above Average

**For EACH PERSON, write the number in COLUMN 12**

---

*Column 13:*

---

**If the opportunity arose, how likely is it that you would choose this person for a professional military education course?**

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

**For EACH PERSON, write the number in COLUMN 13**

---

*Column 14:*

---

**If the opportunity arose, how likely is it that you would help this person move to a job that would help his or her career?**

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

**For EACH PERSON, write the number in COLUMN 14**

---

*Column 15:*

---

**If the opportunity arose, how likely is it that you would recommend this person for early promotion?**

- 1 - Not At All Likely
- 2 - Slightly Likely
- 3 - Moderately Likely
- 4 - Very Likely
- 5 - Exceptionally Likely

**For EACH PERSON, write the number in COLUMN 15**

---

*Column 16:*

---

**Based on your personal knowledge of this person's behavior at work, how qualified do you feel you are you to judge his or her performance level?**

- 1 - Not *Qualified* at All
- 2 - Not Very *Qualified*
- 3 - Fairly *Qualified*
- 4 - Very *Qualified*
- 5 - Extremely *Qualified*

**For EACH PERSON, write the number in COLUMN 16**

---

*Column 17:*

---

**How confident are you that your ratings accurately reflect this person's performance?**

- 1 - Not *Confident* at All
- 2 - Not Very *Confident*
- 3 - Fairly *Confident*
- 4 - Very *Confident*
- 5 - Extremely *Confident*

**For EACH PERSON, write the number in COLUMN 17**

---

*Column 18:*

**Overall, how relevant are the items in column 1-15 for this person's job?**

- 1 - Not *Relevant* at All
  - 2 - Not Very *Relevant*
  - 3 - Fairly *Relevant*
  - 4 - Very *Relevant*
  - 5 - Extremely *Relevant*

**For EACH PERSON, write the number in COLUMN 18**

## Appendix C: Demographics of Workers -- March 1996

Sex	Number	Percentage
No Response	0	0.0%
Male	143	79.4%
Female	37	20.6%
<b>TOTAL</b>	<b>180</b>	

Race	Number	Percentage
No Response	1	0.6%
White	111	61.7%
Black	24	13.3%
Hispanic	19	10.6%
Asian	16	8.9%
Other	9	5.0%
<b>TOTAL</b>	<b>180</b>	

Age	Number	Percentage
No Response	0	0.0%
Under 20	20	11.1%
21-25	107	59.4%
26-30	35	19.4%
31-40	18	10.0%
Over 40	0	0.0%
<b>TOTAL</b>	<b>180</b>	

Education	Number	Percentage
No Response	0	0.0%
Not complete	1	0.6%
HS		
HS or GED	141	78.3%
2-year degree	21	11.7%
4-year degree	7	3.9%
Other	10	5.6%
<b>TOTAL</b>	<b>180</b>	

TADMS	Number	Percentage
No Response	0	0.0%
Less than 2 yrs	68	37.8%
2 - 5 yrs	68	37.8%
6 - 10 yrs	25	13.9%
11 - 15 yrs	17	9.4%
Over 15 yrs	2	1.1%
<b>TOTAL</b>	<b>180</b>	

Rank		
No response	0	0.0%
E-1 and E-2	41	22.8%
E-3	52	28.9%
E-4	54	30.0%
E-5	31	17.2%
E-6 and above	2	1.1%
<b>TOTAL</b>	<b>180</b>	

Months in Work Center	Number	Percentage
No Response	4	2.2%
Under 2 months	16	8.9%
2 months	14	7.8%
3 months	15	8.3%
4 months	129	71.7%
Over 5 months	2	1.1%
<b>TOTAL</b>	<b>180</b>	

Skill Level		
No response	0	0.0%
1	0	0.0%
3	81	45.0%
5	80	44.4%
7	19	10.6%
9	0	0.0%
<b>TOTAL</b>	<b>180</b>	

## Appendix D: Demographics of Supervisors -- March 1996

Sex		
	Number	Percentage
No Response	1	2.6%
Male	33	86.8%
Female	4	10.5%
<b>TOTAL</b>	<b>38</b>	

Race		
	Number	Percentage
No Response	2	5.3%
White	24	63.2%
Black	8	21.1%
Hispanic	3	7.9%
Asian	1	2.6%
Other	0	0.0%
<b>TOTAL</b>	<b>38</b>	

Age		
	Number	Percentage
No Response	2	5.3%
Responded	36	94.7%
<b>TOTAL</b>	<b>38</b>	
Average	34.0 years	
standard	6.3 years	
dev.		
Minimum	26 years	
Maximum	54 years	

Education		
	Number	Percentage
No Response	2	5.3%
Not complete	0	0.0%
HS		
HS or GED	24	63.2%
2-year degree	6	15.8%
4-year degree	6	15.8%
Other	0	0.0%
<b>TOTAL</b>	<b>38</b>	

TADMS		
	Number	Percentage
No Response	1	2.6%
Responded	37	78.9%
<b>TOTAL</b>	<b>38</b>	
Average	13.8 years	
standard	5.5 years	
dev.		
Minimum	3 years	
Maximum	34 years	

Grade - Enlisted Only (excludes 1 civilian and 2 officers)		
	Number	Percentage
No response	1	2.9%
E-4	2	5.7%
E-5	17	48.6%
E-6	9	25.7%
E-7	5	14.3%
E-8	1	2.9%
E-9	0	0.0%
<b>TOTAL</b>	<b>35</b>	

Years in Work Center		
	Number	Percentage
No Response	1	2.6%
Responded	37	97.4%
<b>TOTAL</b>	<b>38</b>	
Average	2.3 years	
standard	5.6 years	
dev.		
Minimum	0.0 years	
Maximum	34.8 years	

Skill Level - Enlisted Only (excludes 1 civilian and 2 officers)		
	Number	Percentage
No response	1	2.9%
1	0	0.0%
3	0	0.0%
5	8	22.9%
7	23	65.7%
9	3	8.6%
<b>TOTAL</b>	<b>35</b>	

### **Appendix E: Situational Factor Questions**

Constraints	Question Numbers (Workers' Survey)	Variable Names	Number of Items
Scheduling	13, 25, 61	c5, c17, c53	3
Time	14, 27, 40, 49	c6, c19, c32, c41	4
Cooperation	15, 26, 46, 53, 62, 64	c7, c18, c38, c45, c54, c56	6
Weather	17, 29, 50	c9, c21, c42	3
Transportation	20, 33, 51	c12, c25, c43	3
Authority	34, 44, 57	c26, c36, c49	3
Policy	19, 30, 41, 47, 55, 63	c11, c22, c33, c39, c47, c55	6
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## Bibliography

Air Force Quality Institute. The Quality Approach, Second Edition. Maxwell Air Force Base AL: Air University Press, 1994.

Cooper, Donald R., and C. William Emory. Business Research Methods, Fifth Edition. Chicago: Richard D. Irwin, Inc., 1995.

Dettmer, H. William. "Quality and the Theory of Constraints," Quality Progress, 28: 77-81 (April 1985).

Dougherty, Joseph T. Effects of Situational Factors on the Work Performance of Aerial Port Technicians. MS thesis, AFIT/GTM/LAR/95S-5. Graduate School of Logistics and Acquisition Management, Air Force Institute of Technology (AU), Wright-Patterson Air Force Base OH, September 1995 (AD-A300 669).

Headquarters, Air Mobility Command, Aerial Port Operations Division, Mr. Howard Stephy (HQ AMC/DOQ). Scott Air Force Base IL. Telephone interview. 13 November 95.

Kane, William D. Task Accomplishment in an Air Force Maintenance Environment. Technical Report. Air Force Office of Scientific Research, Air Force Systems Command, Wright-Patterson Air Force Base OH, February 1981 (AD-A101 108).

Nunnally, Jum C. Psychometric Theory (Second edition). New York: McGraw-Hill Publishing Company, 1978.

O'Connor, Edward J., Joe R. Eulberg, Lawrence H. Peters, and Thomas W. Watson. Situational Constraints in the Air Force: Identification, Measurement, and Impact on Work Outcomes. Final Technical Paper for Period August 1981 - May 1984. Manpower and Personnel Division, Air Force Human Resources Laboratory, Brooks Air Force Base TX, November 1984a (AD -A149 316).

O'Connor, Edward J., Lawrence H. Peters, Adbullah Pooyan, Jeff Weekley, Blake Frank and Bruce Erenkrantz. "Situational Constraint Effects on Performance, Affective Reactions, and Turnover: A Field Replication and Extension," Journal of Applied Psychology, 69: 663-672 (1984b).

Peters, Lawrence H., and Edward J. O'Connor. "Situational Constraints and Work Outcomes: The Influences of a Frequently Overlooked Construct," Academy of Management Review, 5: 391-397 (1980).

Peters, Lawrence H., Edward J. O'Connor and Cathy J. Rudolf. "The Behavioral and Affective Consequences of Performance-Relevant Situational Variables," Organizational Behavior and Human Performance, 25: 79-96 (1980).

Steel, Robert P. and Anthony J. Mento. "Impact of Situational Constraints on Subjective and Objective Criteria of Managerial Job Performance," Organization Behavior and Human Decision Processes, 37: 254-265 (1986).

## **Vita**

Captain Timothy J. Pettit was born on 20 September 1967 in Schenectady, New York. He graduated from White Bear Lake High School in 1986 and entered Iowa State University and their Air Force Reserve Officer Training Corps (AFROTC) later that fall. Upon graduation with a Bachelor's of Science in Aerospace Engineering in 1991, he was commissioned and earned AFROTC's Distinguished Graduate Award. On entering active duty in 1992, he accepted a Regular Commission in the Air Force. He attended the Aircraft and Munitions Maintenance Officer technical school at Chanute Air Force Base, Illinois, enroute to his first assignment at Shaw Air Force Base, South Carolina. There, he was assigned to the 363rd Component Repair Squadron as Officer in Charge, Avionics Flight, and was responsible for intermediate repair on F-16 and A-10 aircraft. In 1993, he rotated within the squadron to the Accessories Maintenance Flight as Flight Commander. His previous assignment began in 1994 with the 55th Fighter Squadron as the Flight Commander of the Sortie Support Flight maintaining A-10 aircraft. Upon graduation from the Air Force Institute of Technology, he will be assigned to the 42nd Transportation Flight at Maxwell Air Force Base, Alabama.

Permanent Address: 11200 D-K Ranch Rd  
Austin, Texas 78759

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**Identifying Situational Constraints  
To Focus Quality Improvement  
in an Air Force Aerial Port**

Captain Timothy J. Pettit (AFIT/GTM/LAR/96S-11)  
Advisor: Lieutenant Colonel James R. Van Scotter (LAR)  
Sponsor: HQ AMC/DOZ, Scott AFB IL 62225-5302

This research analyzes the effects of situational constraints on individual performance within an Air Force Aerial Port squadron. Situational constraint research originated with laboratory studies by Peters and O'Connor in 1980 and was investigated in an Air Force field environment in 1984; mixed results were obtained. Laboratory studies identified direct performance inhibitors (Peters et al., 1980); however, field studies found little correlations with job performance (Kane, 1981; O'Connor et al., 1984a). Data collected in June 1995 (Dougherty, 1995) and March 1996, in this study, were used to accomplish a longitudinal analysis. Correlations between constraints and performance were also low in this study; however, significant reductions in constraints were identified in 12 of the 14 work groups investigated. Results suggest that O'Connor et al.'s measure (1984a) may be useful in identifying bottlenecks requiring managerial actions.